

DOCUMENT RESUME

ED 304 467

TM 012 842

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TITLE The Luria-Nebraska Children's Battery: Is It Too Sensitive?
PUB DATE Aug 87
NOTE 12p.; Paper presented at the Annual Meeting of the American Psychological Association (95th, New York, NY, August 28-September 1, 1987).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Child Development; *Children; *Cognitive Development; Cognitive Processes; *Developmental Stages; Elementary Education; *Intelligence Tests; Piagetian Theory; *Psychological Testing
IDENTIFIERS *Luria Nebraska Neuropsychological Battery (Rev); Neuropsychological Measures; Psychiatric Inpatients; *Test Sensitivity; Wechsler Intelligence Scale for Children (Revised)

ABSTRACT

The relationship between children's cognitive developmental level, as assessed by Piagetian tasks, and their performance on measures of intellectual and neuropsychological functioning was studied. Eight female and 22 male children--ages 8 to 12 years (mean=10.3)--with negative electroencephalographs and neurologic screening and no history of brain impairment participated in testing as part of a comprehensive evaluation following hospitalization at a psychiatric institution. Children were categorized as being in the "pre-operational," "transitional," or "concrete" stage of cognitive development according to performance on the Concept Assessment Kit-Conservation (Goldschmid and Benter, 1968). The first 10 children in each category were selected as subjects, and were tested with the Luria-Nebraska Neuropsychological Battery-Children's Revision (LNNB-CR; Golden, 1980) and the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). Results indicate that the IQ of the children did not differ across the three developmental levels. The three groups did differ significantly concerning the number of elevated LNNB-CR subtests (T-scores greater than or equal to 70), with "pre-operational" children having significantly more elevations than "concrete" children. Chi-square for differences in classification on LNNB-CR as brain damaged (greater than or equal to 3 subtests above critical level) revealed significantly more "pre-operational" than "concrete" children classified as brain damaged. Results suggest that a child's cognitive developmental level may have a significant impact on performance on neuropsychological assessment instruments. Cognitive development should be considered when interpreting results of such instruments. Five tables and one graph present study data. (Author/SLD)

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Is it too Sensitive?

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For presentation at the 95th Annual Convention of the American Psychological Association (August 30, 1987).

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ABSTRACT

The purpose of this study was to investigate the relationship between children's cognitive developmental level as assessed by Piagetan tasks, and their performance on measures of intellectual and neuropsychological functioning. Thirty children, ages 8 to 12 (mean = 10.3) with negative EEGs and neurologic screening and no history of brain impairment, participated in testing as part of a comprehensive evaluation following hospitalization at a psychiatric institution. Children were categorized as in the "Preoperational," "Transitional" or "Concrete" stage of cognitive development according to performance on the Concept Assessment Kit-Conservation (Goldschmid and Benter, 1968). The first ten children in each category were selected as subjects, and were tested with the Luria Nebraska Neuropsychological Battery-Children's Revision (LNNB-CR; Golden, 1980) and the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). Results indicated IQ of the children did not differ across the three developmental levels. The three groups did differ significantly on number of elevated LNNB-CR subtests (T-scores ≥ 70), with "preoperational" children having significantly more elevations than "concrete" children. Chi-square for differences in classification on LNNB-CR as brain damaged (≥ 3 subtests above critical level) revealed significantly more "preoperational" than "concrete" children classified as brain damaged. Results suggest that a child's cognitive developmental level may have a significant impact on performance on neuropsychological assessment instruments. Cognitive development should be considered when interpreting results of such instruments.

Piaget's model of cognitive development, while divided into four sequential stages, closely approximates the five sequential neuropsychological developmental stages in Luria's theoretical model. Both seem to be related in terms of chronological sequence and related behaviors. Golden (1980a) has postulated that a relationship does exist between these two developmental theories.

The purpose of the present study was to examine the relationship between children's cognitive developmental levels and their intellectual and neuropsychological functioning.

METHOD

Thirty children ages 8 to 12 ($\bar{x}$ = 10.3) hospitalized in an inpatient psychiatric institution participated in testing as part of a comprehensive evaluation. Children were categorized as "Preoperational," "Transitional" or "Concrete," according to their performance on the Concept Assessment Kit-Conservation. The first ten children in each category were selected as subjects. The sample included 22 males and 8 females and was 67% white, 23% black and 10% other minorities. The group was heterogeneous in terms of diagnosis and chronicity of psychiatric disturbance. However, no child had a known history of brain impairment, trauma or disease. All children received EEGs and neurologic screening. Those with positive findings were excluded.

All testing was conducted within 45 days of hospitalization. Children were evaluated by trained examiners. In addition to other instruments, all children received the following:

The Concept Assessment Kit-Conservation (CAK-C; Goldschmid and Benter, 1968), which consists of 6 tasks, is designed to determine the child's level of

cognitive development according to Piaget's theory. Children were categorized as "Preoperational," "Transitional" or "Concrete" depending on number of tasks conserved: 1 or 2 tasks, preoperational; 3 or 4 tasks, transitional; 5 or 6 tasks, concrete.

The Luria Nebraska Neuropsychological Battery-Children's Revision (LNNB; Golden, 1980).

The Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechsler, 1974).

Chi-Square for Differences in Classification on LNNB-CR as
Brain Damaged (≥ 3 Subtests Above Critical Level) and
Not Brain Damaged by Group

	Brain Damaged	Not Brain Damaged
Preoperational	9	1
Concrete	3	7
$DF = 1, \chi^2 = 7.5, p \leq .01$ $\phi = .194$		

Mean and Standard Deviations of Ages of
Preoperational, Transitional and Concrete Groups

	Mean	Standard Deviation
Preoperational	9.94	1.43
Transitional	9.77*	1.05
Concrete	11.18*	1.29
F (2,26) = 3.68, p < .04		

Means and Standard Deviations for IQ of
Preoperational, Transitional and Concrete Groups

	Means	Standard Deviation
Preoperational	81	14.08
Transitional	86	14.49
Concrete	92	15.55
F (2,25) = 1.16, p < .33		

Analysis of Variance for Number of
Elevated LNNB - CR Subtests (T-Scores ≥ 70) for
Preoperational, Transitional and Concrete Groups

Source	DF	SS	F
Group	2	76.20	5.59*
Error	27	184.10	

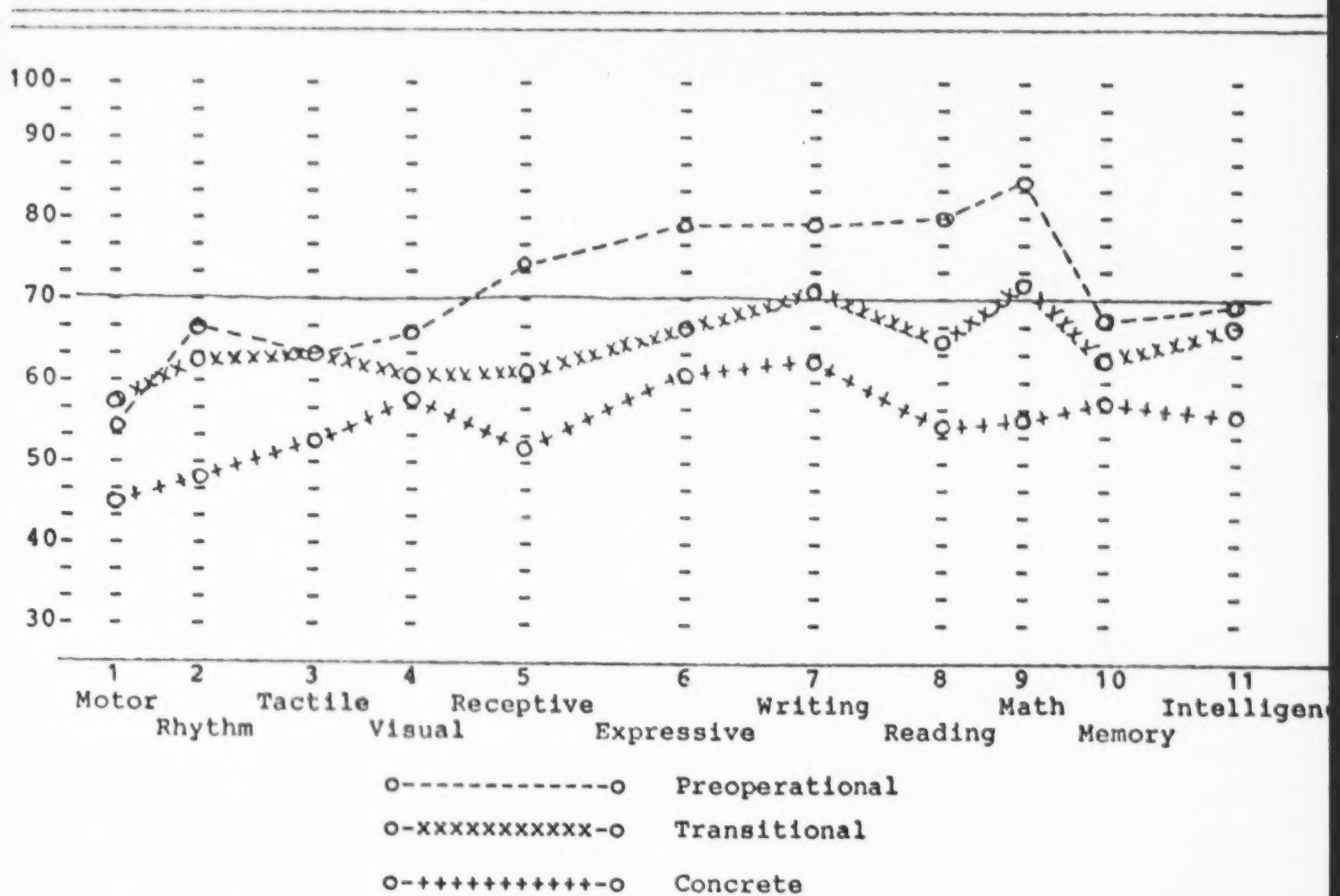
*p $\leq .009$

Newman Keuls Pairwise Comparison for Elevated
LNNB-CR Subtests by Groups

Group	Mean
Preoperational	5.60*
Transitional	3.80
Concrete	1.70*

$p \leq .05$

Mean T-Scores for
Preoperational, Transitional and Concrete Groups
on the LNNB - CR



DISCUSSION

These results suggest that a child's cognitive level of development may have a significant impact on his/her neuropsychological functioning. A significantly greater proportion of children in the Preoperational Stage of development performed within the impaired range on the LNNB-CR than did those in the Concrete Stage. Performance on IQ tests did not differ significantly across groups. Thus, it is likely that developmental level and not IQ is responsible for the differences in performance on the LNNB-CR.

Since none of these children had documented neurological damage, elevations on the LNNB-CR among the Preoperational Group appears to reflect delays in cognitive development rather than brain impairment per se. These results support the need to consider the child's cognitive level when interpreting the LNNB-CR.

It is suggested that when using the LNNB-CR to assess young children, one must consider the functional level of the subject, both cognitively and developmentally. A good indicator of development appears to be Piaget's cognitive levels and the CAK-C is a quantitative measure which appears to be useful to determine cognitive developmental levels. Findings also indicate that pathologic elevations on scales may reflect developmental delay rather than true brain damage. Thus, results should be considered in conjunction with identification of the subject's cognitive developmental level and functional level.